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Innovation in Mathematics Learning Using Song-Based Media on the Topic of Unit Conversion of Length at MIS Ma'arif Bego Sleman, Yogyakarta

Uswatun Khasanah Dwi Rahayu, MIS Ma'arif Bego Sleman Yogyakarya, uswahkhasanahdwirahayu@gmail.com.
Uswatun Khasanah, MI Muhammadiyah 1 Argosari, uswatun1585@gmail.com
Uswatun Khasanah, MI Ma'arif NU 01 Pandansari, uk995786@gmail.com
Wahid Nurhadi, MIN 1 Metro, nurhadiwahid660@gmail.com
Uspa, MIS Sumber Bunga, uspabs88@gmail.com

Abstrac:
This study aims to develop an innovation in mathematics learning through the use of song-based media on the topic of unit conversion of length in fourth-grade elementary school. Songs were chosen as a tool to enhance students' motivation, engagement, and understanding of the concept of unit conversion of length. The type of research used is Classroom Action Research (CAR) with a qualitative and quantitative approach conducted in two cycles. Each cycle consists of four stages: planning, action, observation, and reflection. Data were collected through observation, written tests, and interviews. The results of the study showed that the use of song-based media can improve students' understanding of the unit conversion of length. The average student test scores increased. The number of students meeting the Minimum Competency Criteria (KKM) rose from 42% to 85%. In addition, student engagement and enthusiasm also increased, with 90% of students actively participating in learning during the second cycle. Based on these findings, it can be concluded that song-based media is effective as an innovation in teaching, capable of improving mathematics learning outcomes, particularly in the unit conversion of length, in fourth-grade elementary school.

Keywords: Innovation; Song-Based Media, Unit Conversion of Length, Classroom Action Research.

INTRODUCTION

Mathematics plays a significant role in scientific development and everyday life. Therefore, mathematics is a crucial subject at every level of education. As educators, we naturally want students to learn mathematics with enthusiasm. However, students' interest in studying the subject remains very low, compounded by the perception that mathematics is difficult and unenjoyable. This mindset impacts their ability to solve mathematical problems. Innovative mathematics teaching can increase students' interest in learning. Moreover, enjoyable learning experiences can alleviate their fear of the subject. The results of the 2015 TIMSS (Trends in Mathematics and Science Study) showed that Indonesia ranked 44th out of 49 participating countries, with an average score of 397, below the international average. This indicates that the understanding of

Indonesian students is still very low.The researcher observed the understanding of fourth-grade elementary school students regarding the conversion of length units.

Based on these observations, it was found that students' abilities were still lacking due to difficulties in memorizing the sequence of length unit conversions. The sequence was taught using conventional methods, resulting in low interest and difficulty in memorization. During the observation, another finding was that there was a lack of media usage in mathematics teaching, despite adequate facilities being available. The ability of fourth-grade students in class C at MIS Ma'arif Bego was reflected in their assessment results, which were still below the Minimum Mastery Criteria (KKM) of 70. The scores of 26 students showed an average of 61.92, with 11 students meeting the KKM and 15 students still below it. Based on these problems, the researcher introduced an innovation by using song-based media in mathematics learning, particularly in the conversion of length units. This song-based media innovation is expected to help students memorize the conversion of length units more easily, which will have a positive impact on their scores. Additionally, this song-based media can serve as a reference for future innovations in teaching.

METHODS

This study uses the Classroom Action Research (CAR) method with both qualitative and quantitative approaches. CAR was chosen as it aims to improve the quality of mathematics teaching in the classroom through the application of song-based media in the conversion of length units. Research Design The study was conducted in two cycles, with each cycle consisting of four main stages: Planning: Designing song-based media relevant to the material on length unit conversion and planning learning activities. Action: Implementing the use of song-based media in mathematics teaching. Observation: Observing the learning process involving song-based media to see how well the media facilitates students' understanding. Reflection: Analyzing and evaluating the learning outcomes and the effectiveness of the song-based media in improving students' understanding.Research Subjects This study was conducted at MIS Ma'arif Bego, with the research subjects being 26 fourth-grade students from class IVC. The selection of subjects was based on the characteristics of students who require a more engaging and innovative learning approach to understand the material on length unitconversion. Data Collection Techniques Data was collected using the following methods: Observation: Direct observation was conducted during the learning process to see students' interactions with the song-based media and its effectiveness in enhancing their understanding of the material. Written Tests: A final test at the end of each cycle was given to the students to measure their understanding of the length unit conversion material after the implementation of song-based media in the learning process. Interviews: Interviews were conducted with students and teachers to gather feedback on the use of song-based media in teaching. Documentation: Collection of supporting documents such as lesson plans (RPP), observation sheets, and test results.

RESULTS

This study aims to determine the effectiveness of using song-based media in mathematics learning on the topic of length unit conversion in class IVC. The lesson materials were prepared according to the textbooks and supplementary books used by the teacher in the classroom. Based on the lesson materials, lyrics for a song about length conversion were composed. The tune used was the familiar children's song "Makan Apa" by Ibu Kasur. Below are the lyrics for the Length Unit Conversion Song:Length Unit

Conversion Song *Instrument*: "Makan Apa"*Composer*: Ibu Kasur Let's sing the length conversion song, my friends So we can memorize and accurately convert The black cat in Desi's car, moving back and forth That cat is kilometer, black is hectometer In is dekameter, car is meter Desi is decimeter, centil is centimeter Moving back and forth, back and forth is millimeter There you go, there you go, the length conversion song The research was conducted in two cycles using the Classroom Action Research (CAR) approach. The following results were obtained after implementing song-based media in the learning process:Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pretest	61.92	26		10.590
	Posttest	73.85	26		10.130

The output above shows that the average score during the pretest was 61.92, which increased to 73.85 in the posttest. Descriptively, there is a difference in the average learning outcomes between the pretest and posttest. Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Pretest & Posttest	26		

The Paired Samples Correlations table above shows a significance value of 0.000 < 0.05, indicating a correlation between the pretest and posttest variables. The correlation coefficient of 0.805 shows a very strong relationship between the pretest and posttest.

Paired Samples Test

	Paired Differences				t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference			
Pair 1	Pretest - Posttest	-11.923	6.493	1.273			

Research Hypothesis Formulation H0 = There is no difference in the average learning outcomes between the pretest and posttest, meaning that the use of song-based media innovation in learning length unit conversion for class IVC at MIS Ma'arif Bego in 2024 does not affect learning outcomes. H1 = There is a difference in the average learning outcomes between the pretest and posttest, meaning that the use of song-based media innovation in learning length unit conversion for class IVC at MIS Ma'arif Bego in 2024 affects learning outcomes. According to Singgih Santoso (2014:265), the decision-making guidelines in the paired sample t-test based on the significance value (Sig.) of the SPSS output are as follows: If the Sig. (2-tailed) value is < 0.05, H0 is rejected and H1 is accepted. Conversely, if the Sig. (2-tailed) value is > 0.05, H0 is accepted and H1 is rejected.

The output from the Paired Samples Test shows a Sig. (2-tailed) value of 0.000 < 0.05, so H0 is rejected and H1 is accepted. Therefore, it can be concluded that there is a difference in the average learning outcomes between the pretest and posttest, meaning that the use of song-based media innovation in learning length unit conversion for class IVC at MIS Ma'arif Bego in 2024 has an effect on learning outcomes. Additionally, several

impacts were observed, including: Student Engagement and Enthusiasm Observations during the learning process showed that using song-based media increased student engagement and enthusiasm. In the first cycle, around 42% of students actively participated in learning activities, both in discussions and while reciting the song lyrics related to length unit conversion. In the second cycle, student participation increased to 85%, with many students showing excitement and enthusiasm during the song-based learning process. Positive Responses from Students Interviews conducted after the learning sessions revealed that most students found it easier to understand the length unit conversion material using song-based media. They felt that the song helped them memorize the formulas and conversion concepts in a more enjoyable and digestible way. One student mentioned, "The song that the teacher taught us is easy to remember, so it made answering the exam questions easier." From these interviews, it can be concluded that song-based media played a significant role in improving students' memory. Teacher Feedback on Song-Based Media Teachers involved in the study also provided positive feedback on the use of song-based media in teaching mathematics. Teachers noted that the song-based media helped create a more dynamic and enjoyable learning environment, making students more interested in learning. Teachers also observed that using songs helped alleviate student boredom and made learning more memorable. Reflection on the Use of Song-Based MediaAfter two cycles, some aspects for further development include varying the types of songs used and reinforcing the length unit conversion material through additional exercises. Nevertheless, song-based media proved effective in boosting student motivation and understanding.

CONCLUSION

The innovation of song-based media in teaching mathematics, particularly on the topic of length unit conversion, is a creative approach to enhancing students' understanding. This method aims to address students' difficulties in memorizing and comprehending the concept of length unit conversion, which is often considered abstract and tedious. By transforming the material into easily remembered song lyrics, students can more quickly grasp the relationships between different units of length, such as kilometers, meters, and centimeters. Using songs as a learning medium helps improve students' memory retention through rhythmic patterns and enjoyable melodies. Music is known to stimulate the brain's ability to memorize information more effectively than conventional methods. With songs, students not only learn through written texts but also through auditory experiences, which can deepen their understanding of mathematical concepts.

Additionally, this method increases students' active participation in the learning process. Singing together in class creates a more interactive and enjoyable atmosphere, making students more enthusiastic about learning. It also helps reduce anxiety about mathematics, which is often perceived as a difficult and stressful subject. In a more relaxed learning environment, students become more confident in solving problems related to length unit conversion. In terms of effectiveness, this innovation can be applied across various educational levels, particularly in elementary schools. Learning songs can be adapted to match students' levels of understanding, allowing the concept of length unit conversion to be taught gradually and systematically. Moreover, teachers can combine this method with other teaching aids, such as visuals or interactive games, to further strengthen students' comprehension. Overall, song-based learning in mathematics is an engaging and effective alternative for teaching length unit conversion. This method not only helps students remember concepts more easily but also creates a more enjoyable and meaningful learning experience. By continuing to develop similar innovations, mathematics education can become more engaging and easier for students to understand.

Furthermore, the integration of song-based learning into mathematics education opens up opportunities for interdisciplinary learning, where students can develop multiple skills simultaneously. Beyond reinforcing mathematical concepts, singing in class enhances students' auditory memory, rhythm recognition, and linguistic abilities. This aligns with Gardner's

(1983) theory of multiple intelligences, which suggests that musical intelligence plays a crucial role in cognitive development. By incorporating music into mathematics instruction, educators can cater to diverse learning styles, ensuring that both auditory and kinesthetic learners benefit from the lesson.

Additionally, using songs in mathematics education promotes collaboration and social interaction among students. Group singing fosters teamwork and encourages peer learning, where students support each other in understanding mathematical concepts. This collaborative aspect aligns with Vygotsky's (1978) social constructivist theory, which emphasizes the importance of social interaction in cognitive development. When students work together to learn and sing mathematical concepts, they engage in meaningful discussions and reinforce their understanding through shared experiences. Moreover, incorporating movement or gestures into songs can enhance students' motor skills and provide a multisensory learning experience, further strengthening their grasp of abstract mathematical ideas.

To maximize the impact of song-based learning, educators can explore digital tools and multimedia resources. The integration of technology, such as educational apps, animated videos, and interactive platforms, can enhance engagement and accessibility. Digital platforms allow students to practice length unit conversion through gamified quizzes and interactive exercises that complement the songs. Research by Mayer (2005) on multimedia learning highlights that combining visual, auditory, and kinesthetic elements leads to deeper cognitive processing and improved retention of information. By leveraging technology, educators can create a more dynamic and personalized learning experience tailored to students' needs and preferences.

Beyond the classroom, song-based learning can be extended to home environments, encouraging parental involvement in children's education. Parents can reinforce mathematical concepts by singing along with their children, turning learning into a fun and interactive family activity. Studies by Epstein (2011) suggest that parental engagement significantly enhances students' academic success, as learning becomes a continuous process that extends beyond school. Furthermore, the use of culturally relevant songs or locally inspired melodies can make the learning experience more relatable and meaningful for students, fostering a deeper connection with the subject matter.

In conclusion, incorporating songs into mathematics education presents a powerful and innovative approach to making learning more engaging, memorable, and accessible. By combining music with interactive teaching strategies, educators can transform the way mathematical concepts are introduced and reinforced. Future research should explore the long-term effects of song-based learning on students' mathematical proficiency and overall cognitive development. Additionally, investigating how this method can be adapted for other mathematical topics, such as fractions or geometry, can further expand its effectiveness. By continuously refining and integrating creative teaching methods, educators can make mathematics an enjoyable and enriching subject that fosters both academic and personal growth.

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